

1 **In the Claims:**

2 Claims 1-22 were pending at the time of the Office Action.

3 Claims 1-22 are rejected.

4 No claims are amendeded or canceled by the current response.

5 Accordingly, claims 1-22 remain pending, and, for the sake of convenience
6 are provided in a complete list of claims as follows:
7

8
9 1. (Original) A machine-readable medium having a data structure
10 stored thereon for efficiently ordering a plurality of entities, each entity having a
11 rank within a plurality of ranks, the data structure comprising:

12 a horizontally linked list linking at least a subset of the plurality of entities
13 in at least a descending rank order direction, each entity in the horizontally linked
14 list having a unique rank as compared to the ranks of other entities in the
15 horizontally linked list; and,

16 an array having a plurality of array entries over which the plurality of ranks
17 are distributed such that each array entry has a corresponding range of ranks, at
18 least one array entry each pointing to an entity of the plurality of entities having a
19 greatest rank within the corresponding range of ranks for the array entry.
20

21 2. (Original) The medium of claim 1, the data structure further
22 comprising at least one vertically linked list, each vertically linked list linking in at
23 least one direction a corresponding subset of the plurality of entities having an
24 identical rank.
25

1 3. (Original) The medium of claim 2, wherein each vertically linked
2 list links the corresponding subset of the plurality of entities in a first vertical
3 direction and a second vertical direction.

4
5 4. (Original) The medium of claim 1, the data structure further
6 comprising a head pointer pointing to an entity having a greatest rank of the
7 plurality of ranks of the plurality of entities.

8
9 5. (Original) The medium of claim 1, wherein the horizontally
10 linked list further links at least the subset of the plurality of entities in an
11 ascending rank order direction.

12
13 6. (Original) The medium of claim 1, wherein the plurality of ranks
14 are equally distributed over the plurality of array entries.

15
16 7. (Original) The medium of claim 1, wherein the entity having the
17 greatest rank within the corresponding range of ranks for each of one or more of
18 the at least one array entry is one of a subset of the plurality of entities having the
19 greatest rank within the corresponding range of ranks for the array entry.

20
21 8. (Original) The medium of claim 1, wherein at least one array
22 entry of the plurality of array entries each points to null, corresponding to no entity
23 within the plurality of entities having a rank within the corresponding range of
24 ranks for the array entry.

25

9. (Original) The medium of claim 1, wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue.

10. (Original) A method for removing a particular entity from a plurality of entities, each entity having a rank within a plurality of ranks, the method comprising:

in response to determining that the particular entity is present within a vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank, the corresponding subset including the particular entity, delinking the particular entity from the vertically linked list;

in response to determining that the particular entity is present within a horizontally linked list linking at least a subset of the plurality of entities in at least in a descending rank order direction, the subset including the particular entity, delinking the particular entity from the horizontally linked list; and,

in response to determining that an array entry of a plurality of array entries of an array over which the plurality of ranks are distributed points to the particular entity, adjusting the array entry to point to one of null and another one of the plurality of entities.

11. (Original) The method of claim 10, wherein the array entry has a corresponding range of ranks, and adjusting the array entry to point to one of null and another one of the plurality of entities comprises, in response to determining that the particular entity was present within the vertically linked list, adjusting the array entry to point to a next entity within the vertically linked list.

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2 12. (Original) The method of claim 11, wherein adjusting the array
3 entry to point to one of null and another one of the plurality of entries further
4 comprises, otherwise, in response to determining that the particular entity was
5 present within the horizontally linked list, and that the rank of a next entity within
6 the horizontally linked list is within the corresponding range of ranks for the array
7 entry, adjusting the array entry to point to the next entity within the horizontally
8 linked list.

9
10 13. (Original) The method of claim 12, wherein adjusting the array
11 entry to point to one of null and another one of the plurality of entries further
12 comprises, otherwise, adjusting the array entry to point to null.

13
14 14. (Original) The method of claim 10, further comprising, in
15 response to determining that a head pointer pointing to an entity having a greatest
16 rank of the plurality of ranks of the plurality of entities points to the particular
17 entity, adjusting the head pointer to point to another one of the plurality of entities.

18
19 15. (Original) The method of claim 14, wherein adjusting the head
20 pointer to point to another one of the plurality of entities comprises, in response to
21 determining that the particular entity was present within the vertically linked list,
22 adjusting the head pointer to point to a next entity with the vertically linked list.

23
24 16. (Original) The method of claim 15, wherein adjusting the head
25 pointer to point to another one of the plurality of entities comprises, otherwise, in

1 response to determining that the particular entity was present within the
2 horizontally linked list, adjusting the head pointer to point to a next entity within
3 the horizontally linked list.

4
5 17. (Original) The method of claim 10, wherein each entity of the
6 plurality of entities is a thread, the rank of the entity is a priority for the thread,
7 and the array is a priority queue.

8
9 18. (Original) The method of claim 10, wherein the method is
10 performed by execution of a computer program stored on a machine-readable
11 medium by a processor.

12
13 19. (Original) A method for adding a new entity having a rank within
14 a plurality of ranks to a plurality of entities also each having a rank within the
15 plurality of ranks, the method comprising:

16 of a plurality of array entries of an array over which the plurality of ranks
17 are distributed such that each array entry has a corresponding range of ranks,
18 determining the array entry having the corresponding range of ranks in which the
19 rank of the new entity lies;

20 adjusting the array entry having the corresponding range of ranks into
21 which the rank of the new entity lies to point to the new entity in response to
22 determining that the array entry currently points to null;

23 adjusting the array entry having the corresponding range of ranks into
24 which the rank of the new entity lies to point to the new entity in response to
25

determining that the array entry current points to an entity having a rank less than the rank of the new entity;

linking the new entity into a vertically linked list linking in at least one direction a corresponding subset of the plurality of entities having an identical rank, in response to determining that the rank of the new entity is equal to the rank of any other entity within the plurality of entities; and,

otherwise, linking the new entity into a horizontally linked list linking at least a subset of the plurality of entities in at least a descending rank order direction, each entity in the horizontally linked list having a unique rank as compared to the ranks of other entities in the horizontally linked list.

20. (Original) The method of claim 19, further comprising adjusting a head pointer pointing to an entity having a greatest rank of the plurality of ranks of the plurality of entities to point to the new entity in response to determining that the rank of the new entity is greater than the rank of the entity of the plurality of entities to which the head pointer currently points.

21. (Original) The method of claim 19, wherein each entity of the plurality of entities is a thread, the rank of the entity is a priority for the thread, and the array is a priority queue.

22. (Original) The method of claim 19, wherein the method is performed by execution of a computer program stored on a machine-readable medium by a processor.